Index — 1977 — Volume 20
The Journal of Environmental Sciences

INDEX BY AUTHORS

B

Brooks, W. H., Foster, K. E., Norvelle, M. E., Percious, D. L., *A University Approach to Applied Technical Assistance,* Vol, 20, No. 6, p. 18.

C

Capponi, G. F., *Application of Military Vibration Standards to Public Transport Vehicles,* Vol. 20, No. 5, p. 25.
Caruso, H., *Testing the Viking Lander,* Vol. 20, No. 2, p. 11.
Craig, R. and Miller, D., *The Composition of Recyclables for a Class of Solid Waste Streams,* Vol. 20, No. 6, p. 17.

D

DuBuisson, J. C., *Tradeoff of Thermal Cycling vs Life Cycle Costs,* Vol. 20, No. 1, p. 25.

E

Everett, W. D., *Avionics Testing Using Simulated Mission Profile Environments,* Vol. 20, No. 4, p. 31.

F

Fazzolare, R. A., *Engineering Analysis and the Environmental Aspects of Power Production,* Vol. 20, No. 1, p. 32.
Feroli, J. A., *Improved Simulation of Solar Radiation,* Vol. 20, No. 4, p. 28.
Foster, K. E., Norvelle, M. E., Percious, D. L., Brooks, W. H., *A University Approach to Applied Technical Assistance,* Vol. 20, No. 6, p. 18.
Frank, P. P. and Mier, J. F., *High Temperature/Pressure Materials Test for the Undersea Environment,* Vol. 20, No. 3, p. 26.

G

Gaudet, J. J., *International Electrotechnical Commission Technical Committee 50: Environmental Testing,* Vol. 20, No. 5, p. 29.
Gubser, J. L., Jones, W. N., Piersol, A. G., Zara, J. A.,*Captive Flight and Gunfire Vibration Environments,* Vol. 20, No. 1, p. 9.

J

Jones, W. N., Piersol, A. G., Zara, J. A., Gubser, J. L., *Captive Flight and Gunfire Vibration Environments,* Vol. 20, No. 1, p. 9.

K

Kanerva, R. A., *A More Functional Perspective for Water Pollution Enforcement,* Vol. 20, No. 3, p. 23.
Kidd, D. L., *Another Look at Environmental Realism,* Vol. 20, No. 6, p. 20.

L

LaGrone, J., *An Energy Strategy for the Future,* Vol. 20, No. 5, p. 23.
Lotz, Lt. Gen. W. E., *Department of Defense Test and Evaluation Policy,* Vol. 20, No. 4, p. 13.

M

Maples, C. and Schafer, H. C., *Plain Talk About Reliability Standards: Are They Worth the Effort?* Vol. 20, No. 2, p. 24.
Metry, A. A. *The Fate of Pollutants in Subsurface Environments,* Vol. 20, No. 2, p. 27.
Mier, J. F. and Frank, P. P., *High Temperature/Pressure Materials Test for the Undersea Environment,* Vol. 20, No. 3, p. 26.
Miller, D. and Craig, R., *The Composition of Recyclables for a Class of Solid Waste Streams,* Vol. 20, No. 6, p. 17.

N

Nichols, S. A., *Thermal Vacuum Testing Techniques for Spacecraft,* Vol. 20, No. 6, p. 23.
Norvelle, M. E., Percious, D. L., Brooks, W. H. and Foster, K. E., *A University Approach to Applied Technical Assistance,* Vol. 20, No. 6, p. 18.

P

Parker, E. H., *Let the Standards Be!* Vol. 20, No. 3, p. 18.
Percious, D. L., Brooks, W. H., Foster, K. E. and Norvelle, M. E., *A University Approach to Applied Technical Assistance,* Vol. 20, No. 6, p. 18.
Piersol, A. G., Zara, J. A., Gubser, J. L. and Jones, W. N., *Captive Flight and Gunfire Vibration Environments,* Vol. 20, No. 1, p. 9.
Pusey, H. C., *An Historical View of Dynamic Testing,* Vol. 20, No. 5, p. 9.

R

Rasmussen, H. J., *Operational Capability of the Holloman Test Track's Rain Simulation Facility,* Vol. 20, No. 4, p. 15.
Roffman, A., *Air Pollution Meteorology and the Clean Air Act Amendments of 1976,* Vol. 20, No. 4, p. 9.
Rue, H. D., *System Burn-in for Reliability Enhancement,* Vol. 20, No. 2, p. 18.

S

Schafer, H. C., *Deficiencies in Traditional High-Temperature Storage Testing,* Vol. 20, No. 1, p. 15.
Schafer, H. C., and Maples, C., *Plain Talk About Reliability Standards: Are They Worth the Effort?* Vol. 20, No. 2, p. 24.
Silver, W., *Economical Improvements for Environmental Realism in Reliability Tests,* Vol. 20, No. 4, p. 26.
Simpson M., *NASA'S Unique Environmental Test Facilities,* Vol. 20, No. 3, p. 11.
Shumaker, M. J. and DuBuisson, J. C.,*Tradeoff of Thermal Cycling vs Life Cycle Costs,* Vol. 20, No. 1, p. 25.
Swett, Col. B. H., *Reliable Performance Under Realistic Conditions,* Vol. 20, No. 5, p. 15.

T

Tait, J. N., *Realistic Fatigue Modeling of Vibrating Mechanical Structures,* Vol. 20, No. 6, p. 12.
Teller, E., *Energy Crisis: Alternate Solutions by 1982?* Vol. 20, No. 3, p. 16.
Thayer, S. B., *Reliability Methods in Japan,* Vol. 20, No. 1, p. 30.

V

Vandal, W., *Environmental Testing in South Africa,* Vol. 20, No. 3, p. 29.

W

Ward, H. O., *Energy Recovery in Commercial Buildings,* Vol. 20, No. 6, p. 9.

Z

Zara, J. A., Gubser, J. L., Jones, W. N. and Piersol, A. G., *Captive Flight and Gunfire Vibration Environments,* Vol. 20, No. 1, p. 9.

INDEX BY SUBJECT

EARTH SCIENCES

Ecological Effects

The Fate of Pollutants in Subsurface Environments, Metry, A. A., Vol. 20, No. 2, p. 27. *The main objective of this study was to develop mathematical and computer models to predict lechate/pollutant migration and fate in subsurface environments.*

The Composition of Recyclables for a Class of Solid Waste Streams, Miller D. and Craig, R., Vol. 20, No. 6, p. 17. *A report of selective sorting and classification of trash from a military base for the purpose of determining the amount and type of material for recycling is presented.*

Energy

Engineering Analysis and the Environmental Aspects of Power Production, Fazzolare, R. A., Vol. 20, No. 1, p. 32. *Modern engineers associated with energy and environment problems require analysis capabilities that demand not only a greater sophistication of mathematical and scientific maturity but also a wider scope of interdisciplinary knowledge and social awareness than in the past.*

Energy Crisis: Alternate Solutions by 1982? Teller, E., Vol. 20, No. 3, p. 16. *Dr. Teller's speech at the 1977 Annual Meeting was in response to President Carter's energy program submitted to the U.S. Congress on April 20, 1977. The urgent need for a sensible national energy policy is emphasized.*

Energy Recovery in Commercial Buildings, Ward, H. O., Vol. 20, No. 6, p. 9. *This paper reviews the mechanisms by which heat energy is wasted in office, commercial, and industrial structures. Methods for recovering otherwise wasted heat and economical advantages of specific applications are presented.*

An Energy Strategy for the Future, LaGrone, J., Vol. 20, No. 5, p. 23. *A general discussion of the energy problem with comparisons between President Carter's Energy Program and the policies advocated by Amory Lovins in Foreign Affairs Magazine as well as strategy for future energy conservation and development is presented.*

Environmental Assessment

A More Functional Perspective for Water Pollution Enforcement, Kanerva, R. A., Vol. 20, No. 3, p. 23. *Within the past few years increased public support, new legislation with tougher penalties, and precedent-setting court decisions have served to awaken concern for more effective enforcement. It is the contention of the author that a more functional perspective is needed to ensure effective enforcement programs.*

Air Pollution Meteorology and the Clean Air Act Amendments of 1976, Roffman, A., Vol. 20, No. 4, p. 9. *This paper evaluates various aspects of the suggested Clean Air Act amendments and puts them in perspective from the viewpoint of air pollution meteorology. In particular, this paper includes a discussion of: 1) air pollution dispersion modeling and meteorological issues and their relationship to the suggested amendments and 2) enforcement issues related to the suggested amendments through ambient air quality monitoring.*

TEST AND EVALUATION

Acoustics

NASA's Unique Environmental Test Facilities, Simpson, M., Vol. 20, No. 3, p. 11. *The Launch Phase Simulator is described which is one of the most sophisticated combined environment test facilities in existence. It includes an acoustic noise system in addition to acceleration, vacuum and vibration systems.*

Avionics Testing Using Simulated Mission Profile Environments, Everett, W. D., Vol. 20, No. 4, p. 31. *A Manufacturers Run-In (MRI) test containing "thermo-acoustic" features used broadband random noise to reproduce flight vibration experienced by the AIM-9L missile during captive flight.*

Climatics

Deficiencies in Traditional High-Temperature Storage Testing, Schafer, H. C., Vol. 20, No. 1, p. 15. *The paper takes issue with the use of MIL-STD-810, Method 501.1, Procedure 1 for high temperature testing to simulate desert or other high temperature exposure. A closer simulation of the solar radiation forcing is proposed.*

Tradeoff of Thermal Cycling vs Life Cycle Costs, Shumaker, M. J. and DuBuisson, J. C., Vol. 20, No. 1, p. 25. *This paper reports on work accomplished at Martin Marietta Aerospace to keep total program costs at a minimum. This paper illustrates how the authors optimize the number of thermal cycles to be employed during acceptance testing as a function of hardware complexity (vis-a-vis reliability) in order to reduce overall life cycle costs (LCC).*

Criteria and Standards

Plain Talk About Reliability Standards: Are They Worth the Effort? Maples, C. and Schafer, H. C., Vol. 20, No. 2, p. 24. *This is a hard-hitting article on Reliability Test Standards and the problems of translating environmental forcing functions into reasonable design criteria.*

Let the Standards Be! Parker,, E. H., Vol. 20, No. 3, p. 18. *Existing environmental standards are much maligned, but a lot of the criticism would disappear if the standards could talk back. While the standards are not perfect, they are a cut above the people who frequently misuse and abuse them. Fulfillment of the purposes of the standards may be sacrificed in the name of expediency—the catalyst that takes credibility away from well-designed, well-meaning and well-intended standards.*

Deficiencies in Traditional High-Temperature Storage Testing, Schafer, H. C., Vol. 20, No. 1, p. 15. *This article takes issue with the use of MIL-STD-810, Method 501.1, Procedure 1 for high temperature testing to simulate desert or other high temperature exposure. Questions are posed for environmental test engineers to find the answer for better test methods in order to keep the testing mandate.*

Air Pollution Meteorology and the Clean Air Act Amendments of 1976, Roffman, A., Vol. 20, No. 4, p. 9. *The paper points out significant weak points in proposed congressional clean air regulations and suggests re-evaluation of the regulations for compatability with air pollution meteorology concepts.*

Department of Defense Test and Evaluation Policy, Lotz, Lt. Gen. W. E., Vol. 20, No. 4, p. 13. *This keynote address delivered at the 23rd Annual Technical Meeting of the I.E.S., Los Angeles, April 25, 1977, is an explanation of the intent and functioning of the Office of Deputy Director of Defense Research and Engineering, Pentagon.*

Dynamics

Captive Flight and Gunfire Vibration Environments, Piersol, A. G., Zara, J. A., Gubser, J. L., and Jones, W. N., Vol. 20, No. 1, p. 9. *The purpose of this paper is to summarize the results of the tests conducted to evaluate the Harpoon vibration environment during captive flight on various aircraft.*

Testing the Viking Lander, Caruso, H., Vol. 20, No. 2, p. 11. *The article describes the role of the Lander (Structural) Dynamic Test Model (LDTM) during development and qualification tests and describes the dynamic environmental test levels.*

NASA's Unique Environmental Test Facilities, Simpson, M., Vol. 20, No. 3, p. 11. *NASA's unique space simulation facilities have been instrumental in achieving the launch, flight, and landing reliabilities of generations of successful space vehicles over the past two decades. Much of this reliability improvement has resulted from careful environmental testing and analysis in NASA's special test facilities. The facilities described in this article have been primary contributors to NASA flight mission successes.*

Economical Improvements for Environmental Realism in Reliability Tests, Silver, W., Vol. 20, No. 4, p. 26. *This article discusses the attractiveness of conducting vibration tests in a less-costly fashion using light-weight fixturing, impulsive acoustic stress, impulsive random excitation and repetitive impact vibrators.*

Application of Military Vibration Standards to Public Transport Vehicles, Capponi, G. F., Vol. 20, No. 5, p. 25. *This paper discusses the development of a tentative vibration test specification for the ticket machines used on ATM buses in Milan, Italy, based on MIL-STD-810B.*

(Continued on page 28.)

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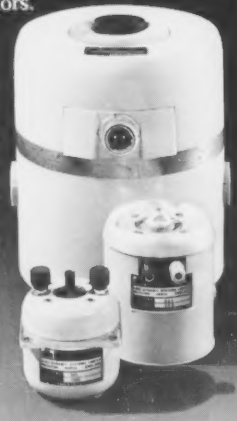

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JOURNAL INDEX

(Continued from page 27.)

An Historical View of Dynamic Testing, Pusey, H. C., Vol. 20, No. 5, p. 9. *Developments in the field of dynamic testing over the past thirty years are examined. Assessment of present capabilities and future needs leads to the conclusion that the problems to be solved are more managerial than technical. Some controversial questions are posed with respect to dynamic tests and specifications.*

Environmental Testing in South Africa, Vandal, W., Vol. 20, No. 3, p. 29. *This report is on testing techniques, equipment, and practices in a South African industrial environmental test laboratory with some insights into the simple dynamic testing being performed and the most obvious differences between the USA and South Africa.*

Realistic Fatigue Modeling of Vibrating Mechanical Structures, Tait, J. N., Vol. 20, No. 6, p. 12. *A Naval Air Development Center study program determines the relationships between vibratory energy and fatigue. The paper is a summary of the application of the theoretical study to the laboratory test results, and the failure energy correlation resulting from computer processing of the mathematical models.*

High Temperature/Pressure Materials Test for the Undersea Environment, Mier, J. F. and Frank, P. P., Vol. 20, No. 3, p. 26. *Internal fissures or shear planes have been observed in certain polyurethane and epoxy polymers after exposure to 500 lb/in² helium (He) gas for 24 hours at room temperature followed by decompression to atmospheric pressure and immediate exposure to 70°C for short periods of time. An explanation for the observed polymeric failure is given which agrees with previously described theory.*

Environmental Testing in South Africa, Vandal, W., Vol. 20, No. 3, p. 29. *A report on typical test sequences, facilities and practices includes observations on differences between climatic testing in the USA and South Africa.*

Operational Capability of the Holloman Test Track's Rain Simulation Facility, Rasmussen, H. J., Vol. 20, No. 4, p. 15. *The High Speed Test Track at Holloman AFB, NM, simulates selected portions of flight trajectories by means of rocket sleds. The objective of this paper is to report about track capabilities for rain erosion testing.*

Improved Simulation of Solar Radiation, Feroli, J. A., Vol. 20, No. 4, p. 28. *An effort to assemble suitable lamps in a solar radiation chamber to produce radiant energy that will more closely conform to the distribution of ultraviolet, visible and infrared energy required in the solar radiation test of MIL-STD-810C is presented.*

Avionics Testing Using Simulated Mission Profile Environments, Everett, W. D., Vol. 20, No. 4, p. 31. *A Manufacturer's Run-In (MRI) test containinig "thermo-acoustic" features used thermal forcing functions to reproduce flight temperatures experienced by the AIM-9L missile during captive flight.*

Economical Improvements for Environmental Realism in Reliability Tests, Silver, W., Vol. 20, No. 4, p. 26. *This article points out how various induced environmental effects such as temperature cycling produce repetitive stresses in electronic hardware. A recommendation is made for emergency funding of an R&D effort to develop a high volume low cost alternative test procedure for the present cyclical temperature test.*

International Electrotechnical Commission Technical Committee 50: Environmental Testing, Gaudet, J. J., Vol. 20, No. 5, p. 29. *This report covers major decisions and recommendations of the shock and vibration and climatic technical committees 50, 50A and 50B reached at 1977 meetings in Zurich and Moscow.*

Reliability and Combined Environments

Reliability Methods in Japan, Thayer, S. B., Vol. 20, No. 1, p. 30. *During a 1974 sabbatical leave from teaching quality control and reliability at Colorado State University, the author visited 19 Japanese companies to observe first-hand how the Japanese achieve their successes.*

System Burn-in for Reliability Enhancement, Rue, H. D., Vol. 20, No. 2, p. 18. *This paper describes methods whereby "opti-*

mum" screening factors can be determined, making possible the attainment of the desired level of equipment reliability. The utility of assessing burn-in screen defect detection effectiveness is obvious when the requirements of MIL-STD-781 are made a contractual obligation, but it is shown that burn-in factors should be considered important even if the contract does not require a reliability demonstration test.

Plain Talk About Reliability Standards: Are They Worth the Effort? Maples, C. and Schafer, H. C., Vol. 20, No. 2, p. 24. *A wide-ranging discussion of environmental testing, origin of standards, interfacing with the "system", MIL-STD-1670A and revitalization of IES technical committees including current test management and planning practices are called into question and improvements suggested.*

Let the Standards Be! Parker, E. H., Vol. 20, No. 3, p. 18. *This is a defense of MIL-STD-781B based on the premise that the current standard has never been correctly applied. The advisability of implementing MIL-STD-781C is questioned.*

Economical Improvements for Environmental Realism in Reliability Tests, Silver, W., Vol. 20, No. 4, p. 26. *Pressure to improve reliability of large avionic systems has generated strong constructive criticism of current test and management procedures. Low cost alternatives to traditional dynamic and climatic test methods are proposed to satisfy the need for more and better tests at minimum cost.*

Avionics Testing Using Simulated Mission Profile Environments, Everett, W. D., Vol. 20, No. 4, p. 31. *A Manufacturer's Run-In (MRI) test has been used for improving the reliability of the Air-borne Instrumentation Subsystem (AIS) pod. The environmental stresses applied in this test were those of a representative flight mission profile and were induced in the pod by the thermo-acoustic facility at the Pacific Missile Test Center (PACMISTESTCEN). The test yielded realistic results in terms of the types and rate of failures that occurred in the pods.*

Another Look at Environmental Realism, Kidd, D. L., Vol. 20, No. 6, p. 20. *The author states that people environments are just as important as natural and induced physical environments in achieving high field reliability. The people problems inherent in reliability programs and the difficultty of practically defining sufficient realism are discussed.*

Reliable Performance Under Realistic Conditions, Swett, Col. B. H., Vol. 20, No. 5, p. 15. *Presented at the 1977 Annual Technical Meeting of the IES, this paper gives an extensive overview of the current practices and coming trends in procurement of military equipment including recommendations for improvements.*

Space Sciences

Testing the Viking Lander, Caruso, H., Vol. 20, No. 2, p. 11. *The landings on Mars marked the successful culmination of a mission that was begun 11 months earlier when Viking I was launched from the Kennedy Space Center on August 20, 1975. This article summarizes the major environmental tests to which the Lander was subjected. These tests included thermal, vibration, shock, vacuum and Martian surface simulations.*

NASA's Unique Environmental Test Facilities, Simpson, M., Vol. 20, No. 3, p. 11. A technical description of important and *unique U.S. test facilities such as: Space Environmental Simulator Chamber A, Neutral Buoyancy Space Simulator, Spacecraft Magnetic Test Facility, Zero Gravity Facility and Launch Phase Simulator.*

Thermal Vacuum Testing Techniques for Spacecraft, Nichols, S. A., Vol. 20, No. 6, p. 23. *This paper describes the test program run at NRL to determine the thermal properties of a Cesium frequency standard for the NAVSTAR Global Positioning System (GPS). A thermal and mechanical simulator was constructed for these tests.*

EDUCATION

A University Approach to Applied Technical Assistance, Foster, K. E., Norvelle, M. E., Percious, D. L., Brooks, W. H., Vol. 20, No. 6, p. 18. *Discussion is on the philosophy and structure of the Laboratory of Native Development, Systems Analysis and Applied Technology (NADSAT), University of Arizona. It is designed to assist the economic development efforts undertaken by the Indian Tribes of the Southwestern United States.* ■

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